PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2008-274582
(43)Date of publication of application : 13.11.2008

(51)Int.Cl. *E03B 1/00 (2006.01)*
C02F 1/00 (2006.01)

(21)Application number : 2007-116874
(22)Date of filing : 26.04.2007

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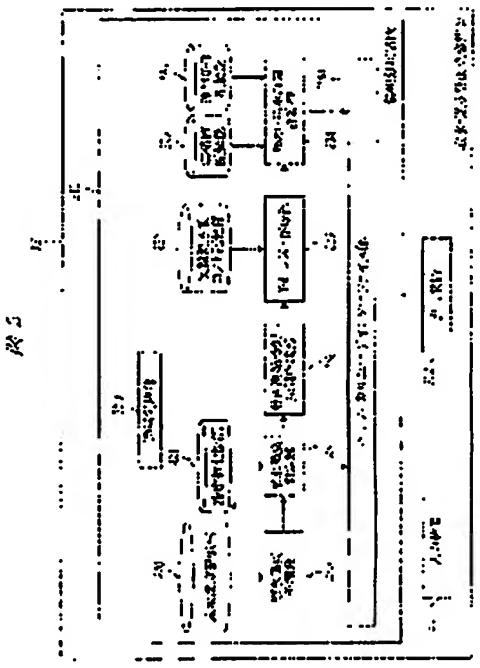
(54) WATER INTAKE AND SUPPLY PLANNING APPARATUS, WATER INTAKE AND SUPPLY PLANNING SYSTEM, AND WATER INTAKE AND SUPPLY PLANNING METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a water intake and supply planning apparatus which creates a planned value of the entire river system, implementing low cost operation at a drinking water treatment plant while satisfying operational conditions of the entire river system, by creating predicted costs for each drinking water treatment plant and at each time, from a predicted raw water turbidity, a past actual turbidity, and costs at a water intake location, formulating an evaluation expression, based on the created predicted costs, and setting the operational conditions of the entire river system as limiting conditions.
SOLUTION: The water intake and supply planning apparatus 121 is composed of a raw water turbidity storage section 220 for storing therein an upstream raw water turbidity, a set value storage section 221, an actual turbidity and cost storage section 222, an actual value storage section 223, an operating condition storage section 224, a raw water turbidity predicting section 230 for predicting a raw water turbidity at the water intake location, a raw water turbidity determining section 231 for determining whether or not a planned value should be changed, based on the predicted turbidity, a planning starting time and period creating section 232 for creating a starting time and a period of a new plan value; a predicted cost creating section 233 for predicting costs, and a water intake and supply plan calculation section 234 for calculating a water intake and supply plan.



* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1]
It is water intake / returning-water schedule planning device which draws up a planned value of a flow of a water purification plant, a water level and an intake pipe way of a service reservoir in a water supply system institution, or a water pipe way,
A raw water turbidity storage parts store which memorizes raw water turbidity of the upper stream of an intake part,
A set value storage part which memorizes a preset value for comparing with prediction turbidity,
A track record turbidity and cost storage parts store which memorizes track record raw water turbidity and cost,
An actual value storage parts store which memorizes the actual value of a water level and a flow,
An employment condition storage section which memorizes employment conditions,
A raw water turbidity forecasting part which predicts said raw water turbidity in said intake part based on said raw water turbidity memorized by said raw water turbidity storage parts store,
A raw water turbidity judgment part which judges whether a planned value is changed based on prediction turbidity predicted by said preset value memorized by said set value storage part and said raw water turbidity forecasting part,
Plan [to create start time and a period of a new planned value based on a decision result of said raw water turbidity judgment part] start time, and a period preparing part,
A prediction cost preparing part which predicts cost based on start time and a period of a new planned value which were created by said track record raw water turbidity memorized by said track record turbidity and cost storage parts store, said cost, and said plan start time and period preparing part,
Water intake / returning-water schedule planning device having water intake / returning-water plan calculation part which calculates water intake / returning-water plan based on said cost predicted by said actual value memorized by said actual value storage parts store, said employment conditions memorized by said employment condition storage section, and said prediction cost preparing part.
[Claim 2]
In the water intake / returning-water schedule planning device according to claim 1,
Water intake / returning-water schedule planning device carrying out by time when the next creates a planned value periodically from time when prediction turbidity exceeds a preset value for new start time and finish time of a planned value when it is judged that said plan start time and period preparing part change a planned value.
[Claim 3]
In the water intake / returning-water schedule planning device according to claim 1,
When there is track record turbidity equal to prediction turbidity, said prediction cost preparing part,
When each cost at the time of the track record turbidity is made into prediction cost and there is no track record turbidity equal to said prediction turbidity, Water intake / returning-water schedule

planning device asking for prediction cost from track record turbidity which exceeds the nearest prediction turbidity, cost at that time, track record turbidity which is less than said nearest prediction turbidity, and cost at that time.
[Claim 4]
In the water intake / returning-water schedule planning device according to claim 1,
Water intake / returning-water schedule planning device, wherein said water intake / returning-water plan calculation part makes prediction cost a valuation plan and performs optimizing calculation of a planned value by making employment conditions into constraints.
[Claim 5]
In the water intake / returning-water schedule planning device according to claim 1,
Water intake / returning-water schedule planning device, wherein it converts said water intake / returning-water plan calculation part into cost and it adds not only prediction cost in a water purification plant but the number of times of a change of cost in institutions other than a water purification plant, or a flow.
[Claim 6]
In the water intake / returning-water schedule planning device according to claim 1,
Said raw water turbidity storage parts store memorizes rainfall of the upper stream of an intake part further,
Water intake / returning-water schedule planning device, wherein said raw water turbidity forecasting part predicts raw water turbidity in an intake part based on raw water turbidity and rainfall which were memorized by said raw water turbidity storage parts store.
[Claim 7]
It is water intake / returning-water planning system which draws up a planned value of a flow of a water purification plant, a water level and an intake pipe way of a service reservoir in a water supply system institution, or a water pipe way,
Water intake / returning-water schedule planning device,
A raw water turbidmetry device which transmits raw water turbidity which it was installed in a river and measured to said water intake / returning-water schedule planning device,
It is installed in a water purification plant and **** cost, and the related actual value and employment conditions of institutions are transmitted to purification of raw water at said water intake / returning-water schedule planning device, Water intake / returning-water planning system provided with transceiving equipment which receives water intake / returning-water plan based on prediction cost from said water intake / returning-water schedule planning device, and transmits to a control device of said water purification plant.
[Claim 8]
In the water intake / returning-water planning system according to claim 7,
Said water intake / returning-water schedule planning device,
A raw water turbidity storage parts store which memorizes raw water turbidity of the upper stream measured with said raw water turbidmetry device,
A set value storage part which memorizes a preset value for comparing with prediction turbidity,
A track record turbidity and cost storage parts store which memorizes track record raw water turbidity and cost,
An actual value storage parts store which memorizes the actual value of a water level and a flow,
An employment condition storage section which memorizes employment conditions,
A raw water turbidity forecasting part which predicts raw water turbidity in an intake part based on raw water turbidity memorized by said raw water turbidity storage parts store,
A raw water turbidity judgment part which judges whether a planned value is changed based on prediction turbidity predicted by preset value memorized by said set value storage part and said raw water turbidity forecasting part,
Plan [to create start time and a period of a new planned value based on a decision result of said

raw water turbidity judgment part] start time, and a period preparing part,
A prediction cost preparing part which predicts cost based on start time and a period of a new planned value which were created by track record raw water turbidity memorized by said track record turbidity and cost storage parts store, cost, and said plan start time and period preparing part,
Water intake / returning-water planning system having based on cost predicted by the actual value memorized by said actual value storage parts store, employment conditions memorized by said employment condition storage section, and said prediction cost preparing part with water intake / returning-water plan calculation part which calculates water intake / returning-water plan.
[Claim 9]
In the water intake / returning-water planning system according to claim 8,
It is installed in a river and has a rainfall measuring device which transmits measured rainfall to said water intake / returning-water schedule planning device,
Said raw water turbidity storage parts store of said water intake / returning-water schedule planning device memorizes rainfall of the upper stream measured with raw water turbidity and said rainfall measuring device of the upper stream measured with said raw water turbidmetry device,
Water intake / returning-water planning system, wherein said raw water turbidity forecasting part of said water intake / returning-water schedule planning device predicts raw water turbidity in an intake part based on raw water turbidity and rainfall which were memorized by said raw water turbidity storage parts store.
[Claim 10]
It is water intake / returning-water planning method which draws up a planned value of a flow of an intake pipe way in a water supply system institution, or a water pipe way,
Raw water turbidity which has water intake / returning-water schedule planning device upstream of an intake part is read, It is judged whether raw water turbidity in an intake part is predicted, and a planned value is changed as compared with raw water turbidity and a preset value which were predicted, Water intake / returning-water planning method creating start time and a period of a new planned value, creating prediction cost from track record turbidity, cost, and prediction turbidity, reading the actual value and employment conditions of institutions, making prediction cost into a valuation plan, and creating a planned value by making the actual value and employment conditions into constraints.

[Translation done.]